



Sources of Toxic Air Pollution

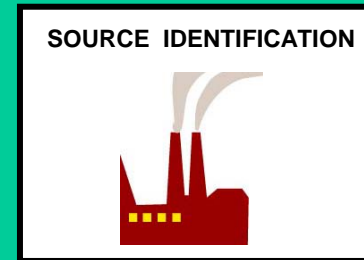
Sources Sources Everywhere -- Where do we Start???



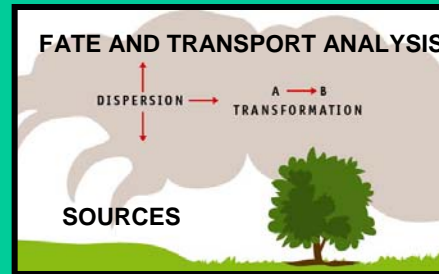
The Detailed Air Toxics Risk Assessment Process

Planning and Scoping

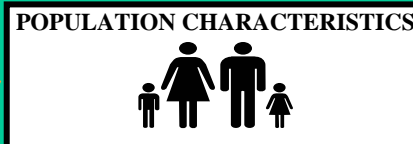
Exposure Assessment



Chemical Release



CHEMICAL CONCENTRATIONS
Air, Soil, Water, Food
(monitor/model)

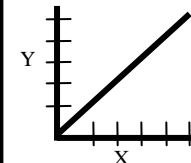


Toxicity Assessment

Hazard Identification



Dose/Response Assessment



Risk Characterization

EXPOSURE
information

DOSE/RESPONSE
information

Quantitative and Qualitative Expressions of Risk/Uncertainty

The Detailed Air Toxics Risk Assessment Process

Planning and Scoping

Exposure Assessment

SOURCE IDENTIFICATION







Toxicity Assessment

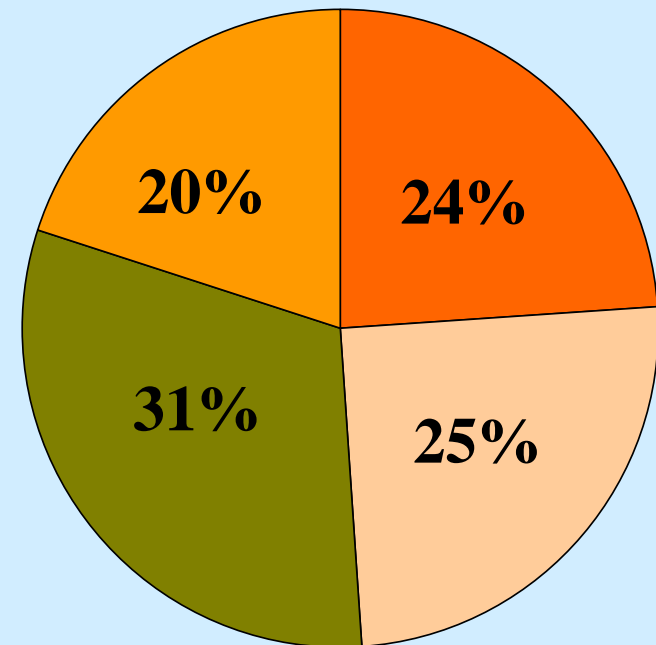
Risk Characterization

Types of Sources of HAPS

EPA divides ambient emission sources into four main groups:

-  Major sources
-  Area source and other sources
-  On-road mobile sources
-  Non-road mobile sources

National Air Toxics Emissions, 1996
4.7M tons



Major Sources

Stationary sources that release ≥ 10 tons per year (TPY) of any one HAP or ≥ 25 TPY of a combination of HAPs

EPA has listed 174 major source categories for regulation

Area Sources

Stationary sources that emit **<10** tons per year of a single air toxic, or **<25** tons per year of a combination of air toxics

- Area sources tend to be smaller facilities
 - Gasoline stations
 - Dry cleaners
 - Car painting shops
 - Small electroplaters
- EPA has listed 70 air source categories to be regulated



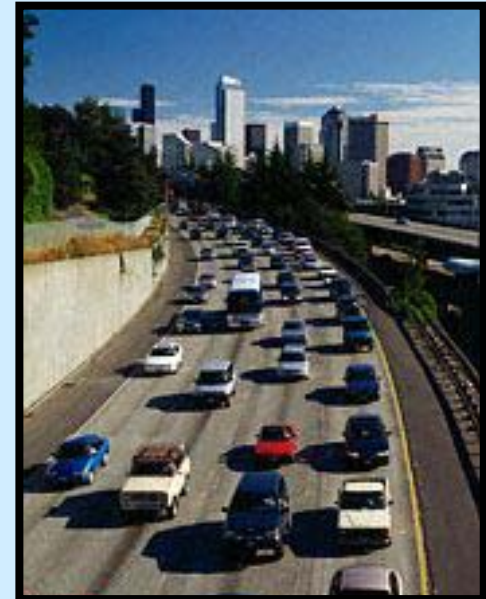
Mobile Sources

Much of the historical focus of mobile source emissions reduction has been on **on-road** cars, trucks, and their fuels

Non-road engines are also significant sources of air toxics and are coming under increasing focus

The main Air Toxics released by both on- and off-road sources:

- Diesel particulate matter and diesel exhaust organic gases
- 20 volatile organic compounds and metals

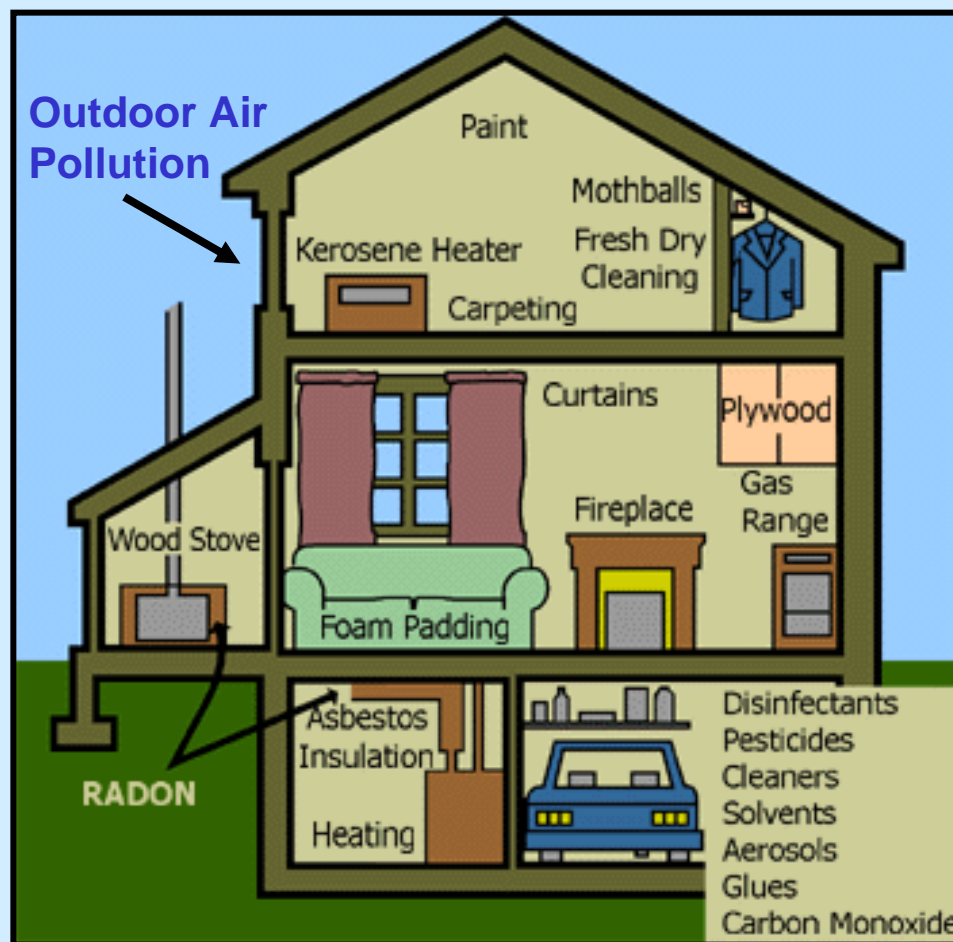


Indoor Sources

Indoor air can become contaminated from numerous sources

Indoor air can have significantly higher concentrations of air toxics than outdoor air

EPA currently does not regulate indoor sources of air toxics



Natural Sources

Many HAPs are found in nature or are produced through natural events

- Forest fires
- Volcanic eruptions
- Natural cycling of mercury
- Windblown entrainment of metallic containing dusts (e.g., arsenic)
- Atmospheric production of formaldehyde and other chemicals from naturally occurring volatile organic compounds, etc.



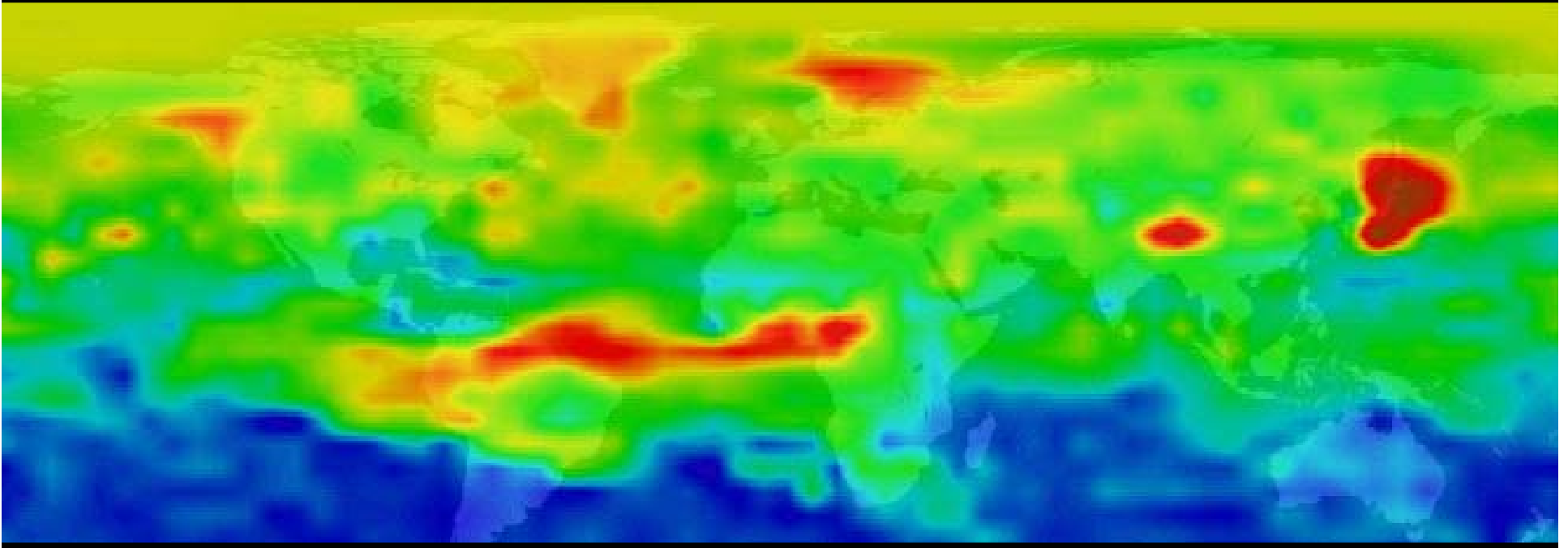
Other Types of Sources

There are a number of other important sources of air toxics that aren't so easy to categorize or count

- Barrel burning
(a significant source of dioxin)
- Accidents



Other Types of Sources



- Long-range transport of air pollutants
- Historical background concentrations (CCl_4)

How do you Quantify Emissions?

Once we have identified the sources of air toxics, we want to accurately estimate the amount of chemicals that are released from those sources

How do you Quantify Emissions?

There are 4 main ways to do this:

1. Actual measurements
 - Stack tests
2. Use of emission factors
 - AP-42
3. Mass-balance and other engineering estimates
4. Best professional judgment

Data on Emissions



EPA tracks emissions of the 188 HAPs in the National Emissions Inventory (NEI)*

- Includes major, area, mobile, and some natural sources (e.g., forest fires)
- Updated every 3 years (1999 most recent)
- Compilation of State, local, and tribal (SLT) inventories, with data gaps filled in by EPA using a variety of methods (e.g., emission factors)

***The NEI also contains information on releases of criteria pollutants**

Data on Emissions

The NEI is a “modeling inventory”

- Provides detailed information on specific source characteristics (e.g., stack location, height, emission rates and temperature, etc.)



Includes both “point” and “non-point” sources

- Point sources – you know the point on the map where the source is (major and some area sources)
- Non-point sources – for some area sources, the NEI provides only an aggregate amount of release for a geographic area (e.g., total tons per year of PERC from all drycleaners in a county)

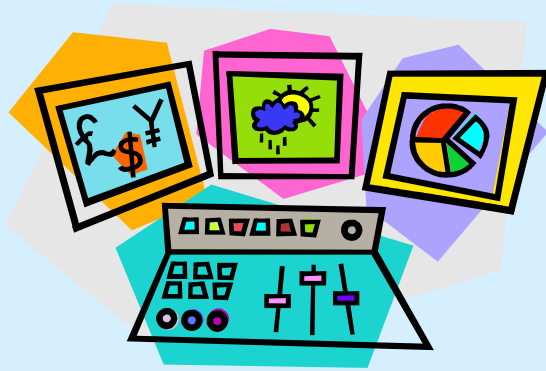
Data on Emissions



Toxics Release Inventory (TRI) provides emissions estimates

- Includes ~650 chemicals from medium to large stationary sources
- Provides air releases as both fugitive and stack
- Useful for initial phase of identifying sources in a study area
 - Large number of covered chemicals
 - Ease of data access
- Not a modeling inventory (does not include specific source characteristics)
- Updated every year (2000 most recent)

Data on Emissions



- When performing an air toxics study, the NEI and TRI are excellent places to start identifying sources and source characteristics
- The NEI may provide sufficient information to perform the risk assessment
- Sometimes it is necessary to obtain additional source specific information from SLT Air Authority permit files

Data on Emissions



State Local and Tribal (SLT) air authority permit files may have source-specific information that has not been provided to EPA for inclusion in the NEI

In some cases, you can go directly to the source under study and ask for in-depth information

Groundtruthing, such as, performing a windshield count or locating filling stations in a particular area can provide direct and current information.